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Part IV
EVALUATION & MANAGEMENT OF DENTOFACIAL INFECTIONS:

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INTRODUCTION

- This presentation will review the evaluation and management of dentofacial infections with emphasis on:
  - ASSESSMENT OF PATIENT
  - DIAGNOSIS
  - PATIENT MANAGEMENT
  - TREATMENT
  - ANTIBIOTIC THERAPY

ASSESSMENT

- Requires a complete medical history and exam of the head and neck region with awareness to systemic factors as part of a comprehensive dental examination

- Identify local and/or systemic signs and symptoms to support the diagnosis of infection:
  - Dolor (pain)
  - Tumor (swelling)
  - Calor (warmth)
  - Rubor (erythema)

ASSESSMENT: (CONT)

- **Functio Laseo (loss of function)**
  - Swallowing (dysphagia)
  - Breathing (dyspnea)
  - Opening (trismus)
- **Constitutional Signs and Symptoms**
  - Malaise
  - Fever (especially if greater than 101F)
  - Chills

ASSESSMENT: (CONT)

- **Evaluate host defense mechanisms:**
  - **Metabolic diseases (Diabetes, Renal, Alcoholism, etc)**
  - **Suppressive diseases (leukemia, HIV/AIDS, tumors, etc)**
  - **Immunosuppressive drugs (Chemotherapy, steroids, etc)**

- **Physical findings of swelling to palpation:**
  - **Fluctuant (fluid filled usually indicating presence of pus)**
  - **Firm (doughy)**
  - **Indurated (hard, “board-like”)**

DIAGNOSIS: *INFECTION*

- **After diagnosing infection:**
  - **Determine etiology (causative factor)**
    - **Odontogenic vs non-odontogenic**
  - **Determine severity**
    - **Low-grade, localized = relatively minimal treatment**
    - **Severe, life threatening = emergent treatment**
  - **Determine cellulitis versus abscess**
  - **Determine whether to treat or refer**

ETIOLOGY

- **ODONTOGENIC ETIOLOGY:**
  - **Endodontic or Periapical secondary to pulpal necrosis**
  - **Periodontal disease**
  - **Fractured tooth**
  - **Post-operative wound infection, e.g., extraction**
  - **Dentoalveolar trauma/fractures**
  - **Osteomyelitis**
  - **Cysts and tumors with secondary infection**

ETIOLOGY

- **NON-ODONTOGENIC ETIOLOGY:**
  - **Salivary glands (e.g., mumps/parotitis/obstruction)**
  - **Sinus (frontal/maxillary/ethmoidal)**
  - **Throat (e.g., Tonsillitis, pharyngitis, epiglottitis)**
  - **Periorbital infections (e.g., sty, cellulitis)**
  - **Skin (e.g., cystic acne, folliculitis, sebaceous cysts)**
  - **Traumatic maxillofacial wounds/fractures**
  - **Animal bites, e.g., cat scratch disease, lyme disease**
  - **TB, fungi, actinomycoses, insect or human bites, etc.**

DETERMINING SEVERITY

- **The pathogenic potential of microbes is favored by two major attributes:**
  - **Virulence: qualities of microbe harmful to host**
  - **Quantity: number of microbes that infect the host**
- **The host defense mechanisms are the major factor in determining the outcome of an infection:**
  - **Under normal conditions, host factors predominate**

DETERMINING SEVERITY

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Diagnosis (cont):

- If microbial factors increase or protective host factors decrease, the pathogenic potential increases
- As this occurs, host reserve diminishes until microbial factors predominate and clinical infection supervenes

DETERMINING SEVERITY

Diagnosis: (cont)

- **Progression of infection**
  - **Vestibular abscess: spread of infection through bone to buccal or lingual/palatal tissues when apex inferior to buccinator in maxilla or superior in mandible**
  - **Buccal Space infection: usually when apex is superior to buccinator in the maxilla or inferior in the mandible**
- **Progression to deeper spaces increases severity**

DETERMINING SEVERITY

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Diagnosis: (cont)

- **Progression of infection in the Maxilla:**
  - **Canine Space: apices superior to levator anguli oris**
  - **Maxillary Sinus**
- **Progression of infection in the Mandible:**
  - **Sublingual Space: apices superior to mylohyoid**
  - **Submandibular Space: apices inferior to mylohyoid**

DETERMINING SEVERITY

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Diagnosis: (cont)

- **Fascial Spaces: fascial planes of the head and neck serve as potential pathways for spread of infection to deeper spaces increasing severity:**
  - **Masticator Space: contains the muscles of mastication including the masseter, both pterygoids and temporalis**
  - **Parapharyngeal Space: borders the above space medially**
  - **Retropharyngeal Space: borders the above space posteriorly with unimpeded inferior extension into the mediastinum**

SIGNS & SYMPTOMS

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CELLULITIS

- Acute duration
- Generalized pain
- Large
- Diffuse borders
- Doughy to indurated
- No pus

ABSCESS

- Longer duration
- Localized pain
- Smaller
- Well circumscribed
- Fluctuant
- Pus present

OUTCOME

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Diagnosis (cont):

- The greater the progression of infection through fascial spaces, the greater the potential risk for poor outcomes
- Increased severity dictates increased urgency and more aggressive treatment
- Know your own limitations when deciding to treat or refer

MANAGEMENT

- **The most important therapeutic role in the management of infection is the drainage of pus, either spontaneously or surgically**
- **Antibiotics are merely an adjunct to drainage and natural resolution**
- **Infections are ultimately cured by the host's own defense mechanisms, not by antibiotics themselves**

MANAGEMENT

- **Antibiotics diminish the pathogenic challenge to a sufficient point where the body's defense mechanisms can defeat the challenge**

- **If the host's immune system is compromised, antibiotic therapy plays a particularly important role in helping the body combat infection**

MANAGEMENT

- **Support the patient medically:**
  - **Ensure adequate oral intake with fluids and proper nutrition**
  - **Consider IV bolus of Normal Saline if dehydrated or vital signs suggestive of hypovolemia (increased pulse/decreased BP)**
  - **Provide adequate pain relief (Marcaine/analgesics)**
  - **Provide close follow-up care**

TREATMENT

Incision and drainage accomplishes the following:

- **Evacuates purulent material surgically, relieving tissue pressure allowing antibiotics to come into direct contact with the source of infection**

- **Changes the environment of the infection site from anaerobic to aerobic**

TREATMENT

- In many situations, extraction of an infected tooth will affect this drainage, with no incision being necessary, negating the need for antibiotics, or at least increase the effectiveness of antibiotics

- If I&D necessary, identify most dependent site over infected area while being aware of vital adjacent submucosal structures (facial artery, mental nerve, submandibular duct, etc)

INCISION & DRAINAGE

- Make incision wide enough to allow drainage
  - Not just a puncture!
- Spread bluntly with a hemostat to depth
- Irrigate copiously
- Place rubber drain to depth of dissection extending 1 cm outside of the incision secured with suture
- Maintain until drainage ceases (2-3 days)
- Cut suture, pull drain, irrigate, leave open

INCISION & DRAINAGE

- If no pus encountered, drain may not be needed
- Leave incision unsutured to heal secondarily while encouraging frequent warm saline rinses
- If pus is obtained, ideally consider culture and sensitivity. Aspiration of the fluctuant area just prior to the I&D is ideal
- Extra-oral I&D may be required in rare occasions and should be managed by an oral surgeon

DEFINITIVE TREATMENT

- **Definitive treatment of etiologic factor should be rendered as soon as feasible**
- **This may be done initially if able to obtain satisfactory anesthesia and there are no medical contraindications (anticoagulation, etc.)**
- **Therapy typically would involve extirpation of a necrotic pulp, extraction of a tooth, scaling and root planing in periodontal abscess, etc.**

ANTIBIOTIC THERAPY

- **Most oral infections are mixed in origin consisting of aerobic and anaerobic gram positive and gram negative organisms**
- **98% of the aerobes found in oral infections, and approximately 70% of the anaerobes, are sensitive to penicillin**
- **Penicillin remains the drug of choice in oral infection (500mg qid)**

ANTIBIOTIC THERAPY

- **Clindamycin is becoming the alternative of choice for penicillin-allergic patients (150-300mg q6h)**
- **Clindamycin offers a broader spectrum of anaerobic coverage over penicillin, particularly helpful in fascial space and bone infections**
- **Clindamycin has been linked with antibiotic-associated colitis , but incidence is actually no greater than other antibiotics including ampicillin, and cephalosporins**

ANTIBIOTIC THERAPY

- **Other alternatives in penicillin-allergic patients:**
  - **Erythromycin: associated with nausea, vomiting, abdominal cramps and diarrhea at optimal doses (500mg qid)**
  - **Often given in lower doses (250mg qid) to decrease symptoms, also decreasing effectiveness of bacteriostatic agent. May consider for mild odontogenic infections**
  - **Clarithromycin has less GI upset with bid dose**

ANTIBIOTIC THERAPY

- **Cephalosporins: 10% incidence of cross-reactivity in penicillin-allergic patients**
- **Cephalosporins and tetracyclines have limited usefulness in most odontogenic infections due to broad spectrum**
- **Other antibiotics noted above have narrower spectrum and therefore more efficacious**

ANTIBIOTIC THERAPY

- **Metronidazole (flagyl) kills every anaerobe without affect on aerobes (250-500mg qid)**
- **Flagyl is excellent choice to add to penicillin in severe infections or when no improvement is noted after 72 hours of penicillin therapy**
- **If still no improvement may empirically consider adding dicloxicillin (250mg q6h) for penicillin-resistant staph, but best to wait for C&S result**

ANTIBIOTIC THERAPY

- A loading dose of double the maintenance dose will achieve therapeutic blood levels more rapidly and is advisable in severe infections
- Treat empirically and alter antibiotic regimen pending sensitivities following culture, as needed
- Follow-up 24-48 hrs after initial treatment monitoring for improvement

HOSPITALIZATION

- **Hospitalization should be considered if:**
  - **Patient is dehydrated, toxic and unable to take fluids**
  - **There is impending airway compromise**
  - **There is any possibility of orbital infection**
  - **Sustained fever**

- **Management in hospital may include CBC with differential, airway imaging, CT scan, extra-oral drainage, IV fluids, IV antibiotic therapy,etc**

SUMMARY

- Treat odontogenic infections early
- Optimize and stabilize patient's host defense mechanisms including hydration and nutrition
- Implement appropriate surgical therapy
- Prescribe appropriate antibiotic therapy
- Definitive therapy of etiologic source ASAP
- Follow patient closely with referral to specialist if patient not improving or getting worse

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